

ANNUAL REPORT

1963

VILLAGE OF MARMORA

WATER SYSTEM

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VILLAGE OF MARMORA

WATER TREATMENT PLANT

PROJECT #58-W-25

by

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OPERATIONS ENGINEER

JULY 1964

VILLAGE OF MARMORA

INCEPTION

The Crowe River provides an ample quantity of water for the Village of Marmora, but the normal colour in the river is about 20 ppm. A study was made to determine the most suitable method of reducing this colour to tolerable limits. This study was conducted in 1960 by Sparkler International Limited under the direction of the OWRC.

The firm of R. V. Anderson and Associates, Toronto, Consulting Engineers, was engaged to prepare plans and specifications for the project.

CONSTRUCTION

The water treatment plant and appurtenances were constructed by Tatham Company Limited, Belleville. The stand-pipe was constructed by Horton Steel Works Limited, Fort Erie and the water mains constructed by Armstrong Brothers Company Limited, Brampton. The construction was completed early in 1962 and the Division of Plant Operations took over the supervision of the project. The project is operated by the Marmora Public Utilities Commission.

TOTAL COST - \$212,977.01

DESIGN

Type of Plant - Diatomite filtration plant

Design Population - 2,000

Design Plant Flow - 250,000 gpd

Per Capita Flow - 125 gallons

EQUIPMENT

Activated Carbon Feeder - Wallace & Tiernan - Type A-690

Diatomite Body Feeder - Wallace & Tiernan - Type A-665

Chlorinator - Wallace & Tiernan - Type A-741

CIRCULATING PUMP

Armstrong Pump - Model 1522

Capacity - 42 IGPM @ 29 foot head

Motor - Century

Volts - 550 - 3 phase

RPM - 1750

HP - 1

DUTY PUMP

Layne Turbine Pump - 8 Stage - Type 4" SDH

Capacity - 125 IGPM @ 217 foot head

Motor - US Motors - Holloshaft

Volts - 550 - 3 phase

RPM - 1800

HP - 15

STAND-BY PUMP

Canada Pump - Centrifugal Split Case - 3" x 4" Class "SAC"

Capacity - 150 IGPM @ 217 foot head

Motor - Continental Engine - gas motor

Type - F-162

Stand-by Capacity - 500,000 gallons

DESCRIPTION OF PROJECT

Water from Crowe Lake enters the system through a 10" screened intake in one of the old sluice-ways. The water depth at the intake is approximately 10 feet and flows rapidly at all times of the year. The water flows by gravity from this point to the filtration room. A static head of approximately 2 feet between the lake and the operating water level in the plant provides a sufficient supply to the system. The operating floor of the filter room is approximately 6 inches above lake water level to prevent any possible overflow of the open detention and filter chambers.

A concrete overflow chamber receives water from the 10 inch intake line. An adjustable overflow weir establishes the operating water level in the detention and filter chambers. Water enters the filter side at any required rate and the rest of the incoming water spills into a drain pit where it flows by gravity back to the river. This overflow chamber eliminates an automatic water level control valve. It also permits a rapid flow of water through the intake line, which prevents clogging or freezing.

Water flows from this chamber, on the filter side, into a concrete detention chamber. The detention chamber is approximately 15 feet long x 5 feet wide and has up and down baffles. It provides 15 minutes detention at a flow rate of 150 Imperial gallons per minute. Powdered activated carbon is metered into the water at the beginning of the

detention chamber. This is fed by a Wallace & Tiernan A-690 volumetric feeder, which is equipped with a bag loader and dust collector.

After the detention chamber, the water enters a slurring chamber ahead of the filter. This chamber is designed to create a turbulence during the pre-coat recirculation cycle to completely slurry the pre-coat powder. During the filtration cycle, body feed diatomite is metered into this chamber by a Wallace & Tiernan Model A-710 wet slurry feeder.

DIATOMITE BODY FEEDER

Water from the slurring chamber, with carbon and diatomite in suspension, enters through an opening at the bottom of the concrete filter chamber. In this way, a sweeping action across the floor of the filter chamber is achieved, which picks up any carbon or diatomite that may have settled between the filter elements. This higher velocity flow occurs under the filter elements and thus has no effect on "cake washing".

In the filter, the water is drawn through stainless steel filter elements by an eight stage, 15 HP turbine pump. The elements are covered with polyethylene cloth and pre-coated with diatomaceous earth. The diatomaceous earth layer removes the carbon and all suspended solids from the water. The body feed diatomite builds up with these solids to form a permeable cake, thus increasing the solids holding capacity of the filter and lengthening the filter system.

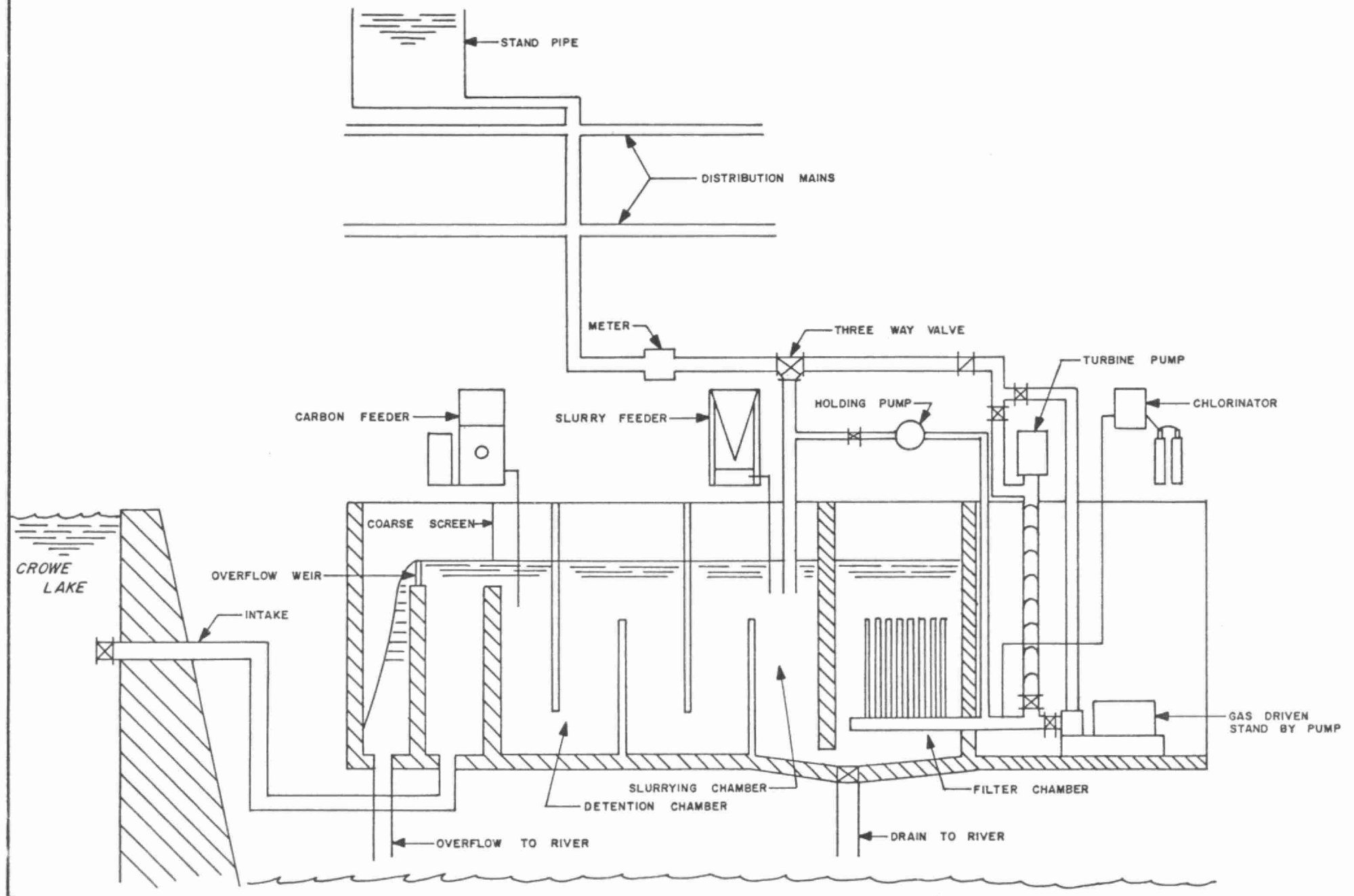
The filtered water is drawn through the filter elements to a bottom collector manifold. This manifold runs through the concrete wall of the filter chamber where it is connected to the suction of the turbine pump. A stand-by gasoline engine driven pump is connected in parallel with the turbine pump to provide service during power failure.

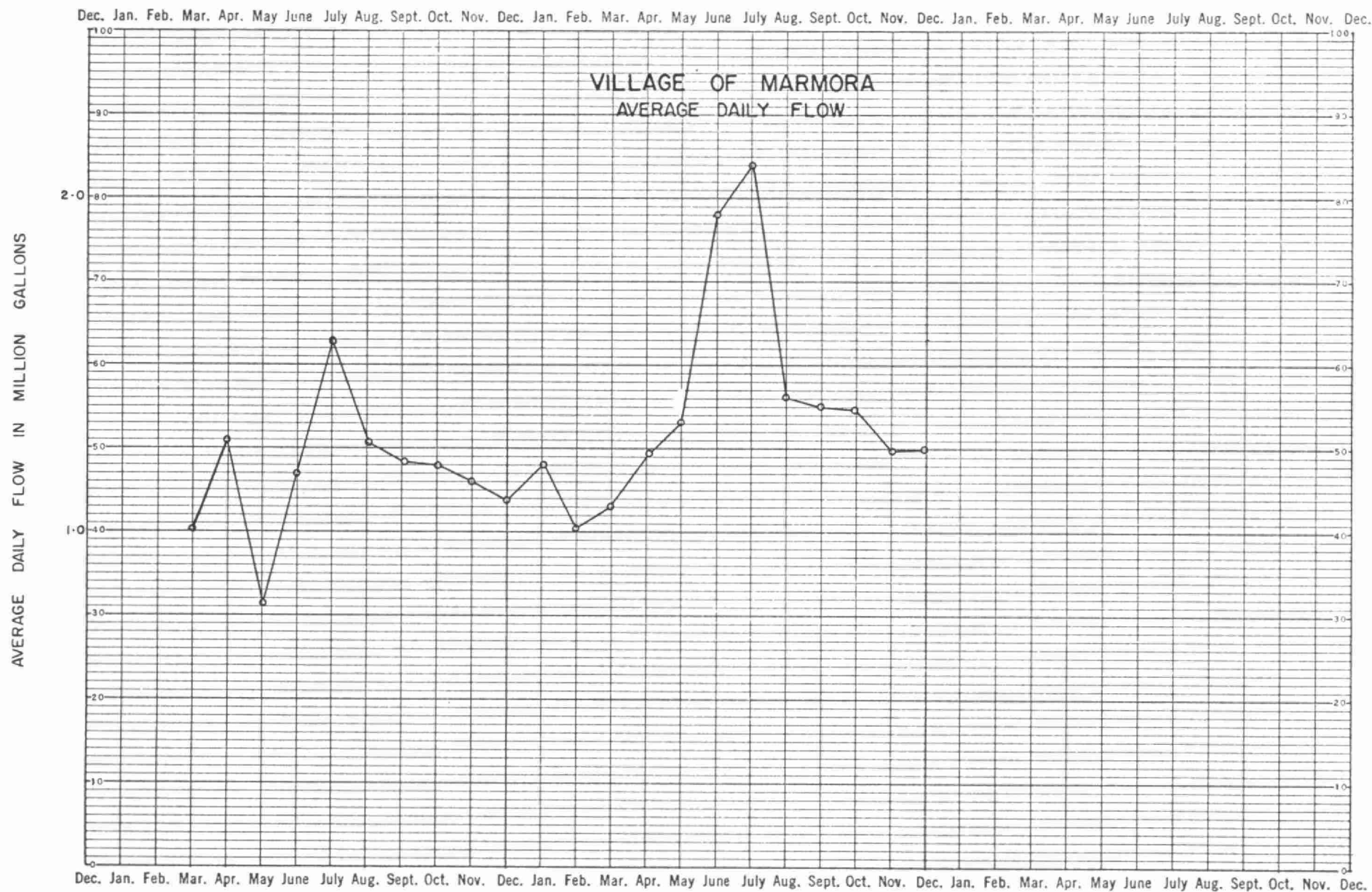
AUXILIARY PUMP

The suction head of either pump is used to draw the water through the filter, while the discharge head is used to pressurize the mains and fill the standpipe. A zero to 30" HG vacuum gauge is connected into the suction line ahead of the pumps and this gauge indicates the relative clogging load on the filter.

Chlorine is injected into the water and the total gallons treated are shown on a meter before the water leaves the building. The water levels in the standpipe are controlled by a mercury column altitude valve in conjunction with a telemetering system to the filtration plant. When the water in the standpipe has reached its maximum level, a signal from the telemeter system starts a 1 HP holding pump which recirculates water through the filter to hold the cake on the elements. The turbine pump and feeders then stop. All electric controls have "hand-off automatic" selectors so the system may be run on manual or automatic.

SCHEMATIC DIAGRAM OF MARMORA WATER SYSTEM

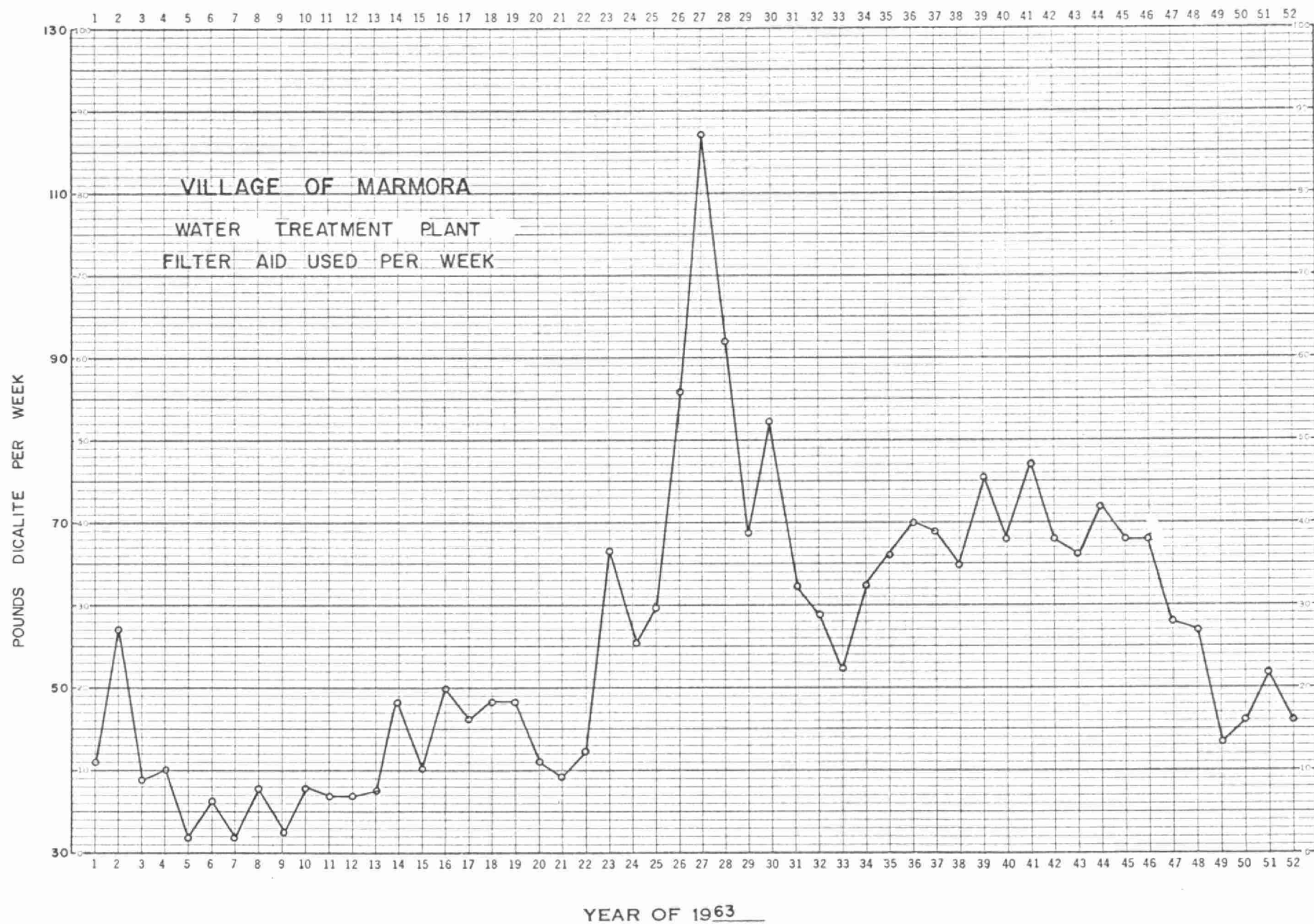


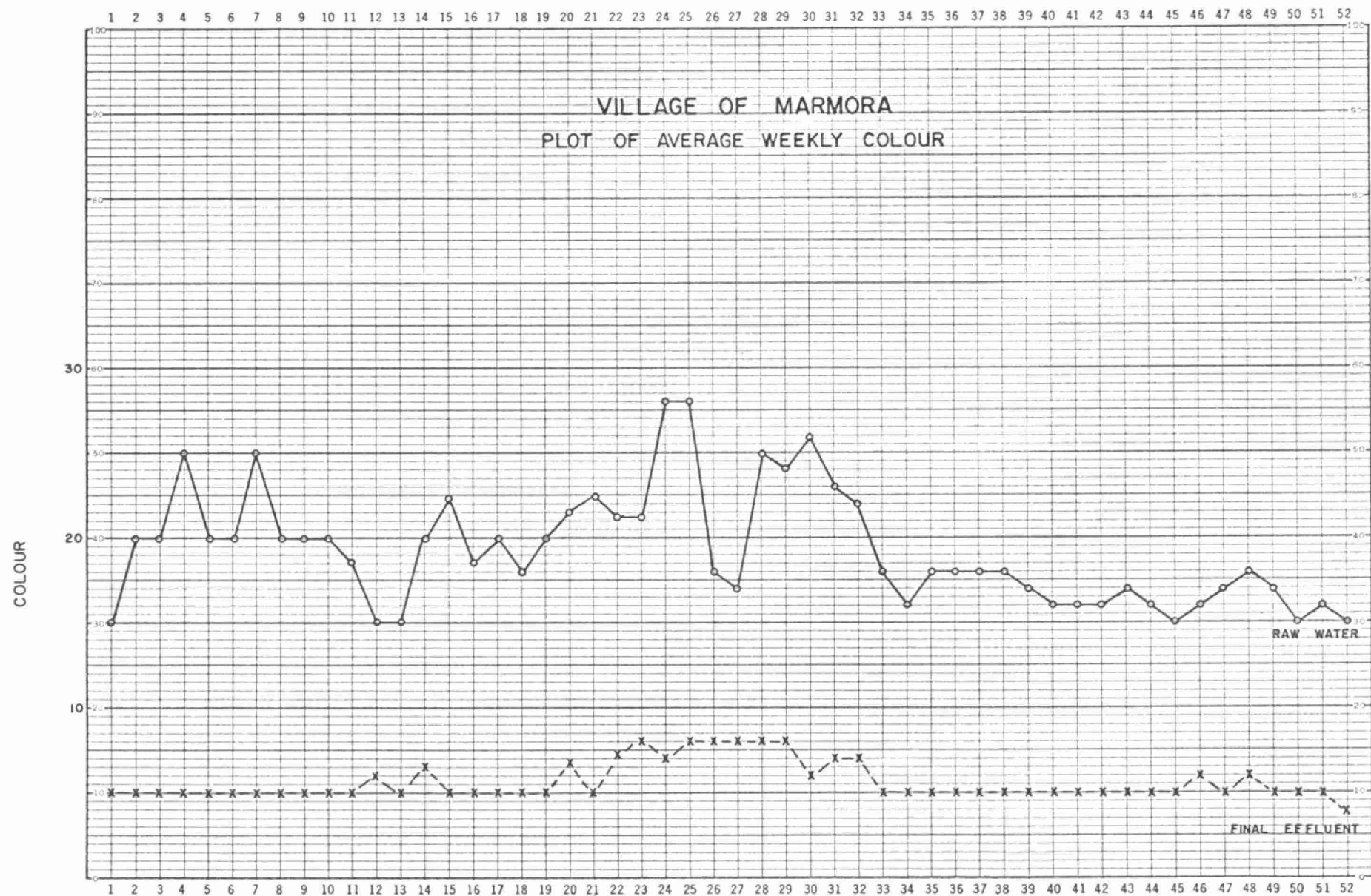


Year of 1962

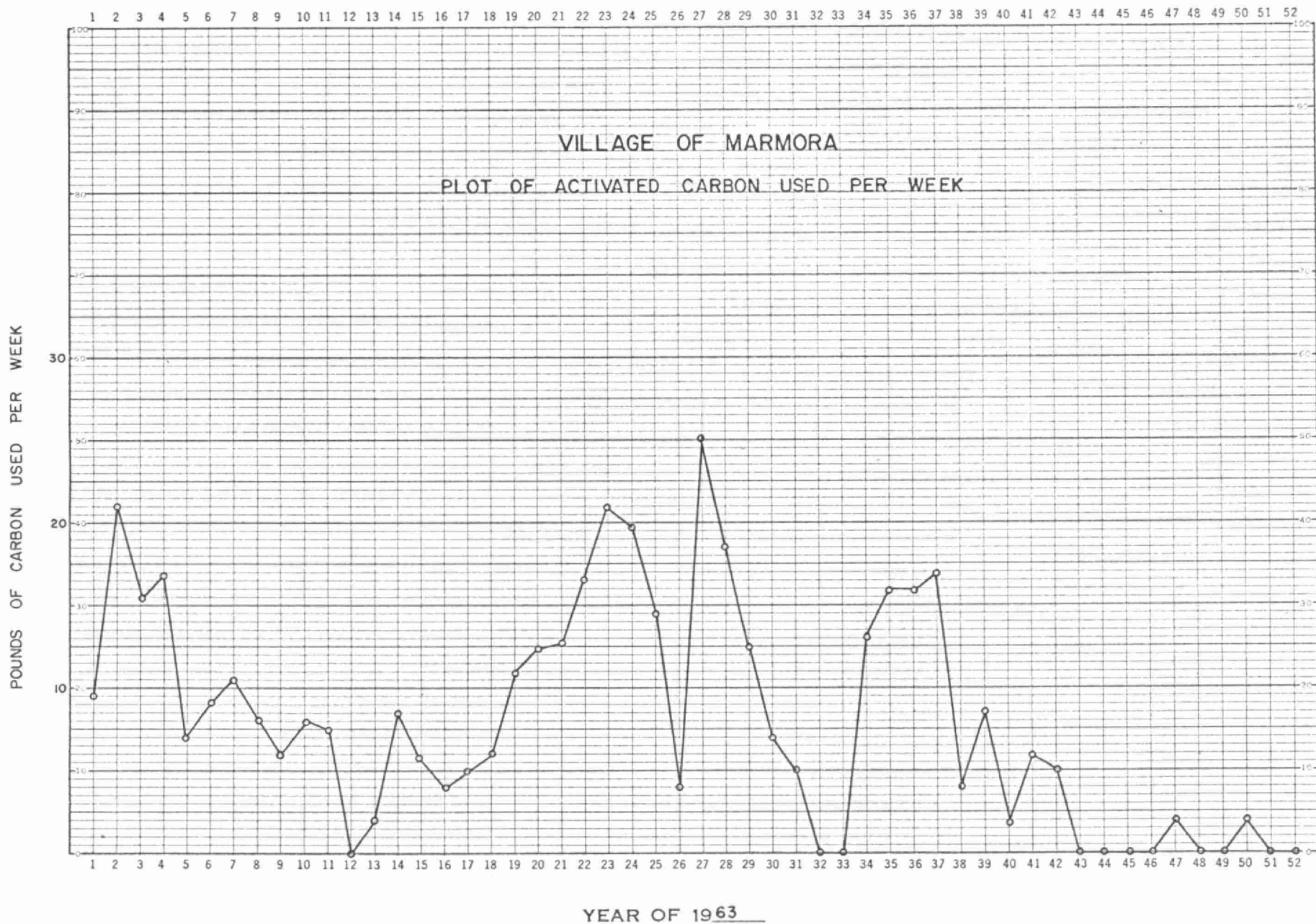
Year of 1963

Year of 19





YEAR OF 1963



LABORATORY ANALYSIS

DATE	SAMPLE	HARDNESS AS CaCO_3	ALKALINITY AS CaCO_3	IRON	CHLORIDE
Jan. 8	raw	94	74	0.27	2
	filtered	102	72	0.22	4
Feb. 14	raw	104	80	0.32	5
	filtered	114	76	0.30	5
Mar. 19	raw	110	86	0.24	6
	filtered	112			
Apr. 16	raw	88	72	0.30	8
	filtered	90	70	0.10	8
June 26	raw	88	72	0.09	1
	filtered	88	68	0.46	4
July 23	raw	88	72	1.56	4
	filtered	88	70	0.20	6
Aug. 6	raw	90	74	0.15	6
	filtered	88	72	0.12	9
20	raw	86	74	0.10	5
	filtered	90	72	0.18	7
Nov. 27	raw				
	filtered				

BACTERIOLOGICAL

<u>DATE</u>	<u>RAW WATER</u>	<u>FILTERED WATER</u>	<u>DISTR. SYSTEM</u>
June 12	18	0	0
27	15	0	0
July 10	36	0	0
23	20	0	0
Aug. 6	9	0	0
20	18	0	0
Sept. 4	7	0	0
17	24	0	0
Oct. 2	11	0	0
16	21	0	0
30	49	0	0
Nov. 13	21	0	0
27	24	0	0
Dec. 10	12	0	0

TOTAL 1963 COSTS

The total cost to the municipality during 1963 was as follows:

Operating	\$ 937.65
Debt Retirement	
Reserve	975.00
Interest	11,829.72
TOTAL	<u>\$13,742.37</u>

NOTE:

The amount in the Reserve for Contingencies Fund as of December 31, 1963 was \$1,745.49.

The operating costs do not include expenses paid directly by the Village of Marmora, such as payroll.

SUMMARY

This report has given in detail some significant data on the operation of the treatment plant in the Village of Marmora.

A total of 16,600,000 gallons of water was treated by the filtration plant in 1963. This is an average daily flow for the year of 45,500 gallons.

Assuming that the municipality spent approximately \$2,000.00 for the operation of the treatment plant over that incurred by the OWRC, the cost per 1,000 gallons of water was approximately 18 cents.

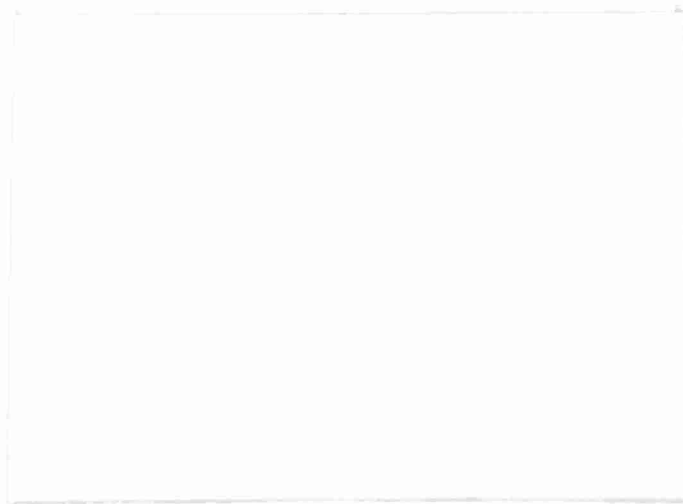
The plant operated during 1963 without any major difficulties.

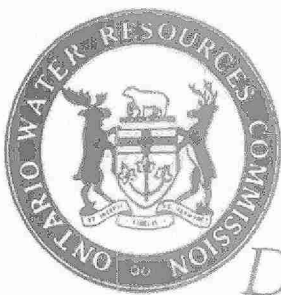
Under the supervision of head office engineers, the municipality has operated and maintained a clean, attractive and efficient operation. The staff of the municipality should be commended for the interest and enthusiasm given to the operation.

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Division of Plant Operations

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